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ABSTRACT

A study was conducted of the use of a computer teleconferencing system developed by Participation Systems Inc. (nicknamed PARTI) as enhancement for two independent study credit courses in the behavioral sciences, Introduction to Effective Communication and Introductory Psychology. An earlier study in the spring and summer of 1983 had tested the efficacy of electronic mail as the delivery system for independent study courses, and found it to be an effective alternative to print-mode independent study. Results of various evaluations of the computer conferencing implemented in March 1984 indicate that the use of teleconferencing courses positively affects both the quality of the educational experience, and the attitudes and motivational levels of the students. Monitoring of the teleconferencing messages indicated that 90% of the students made substantial use of the system. The completion rates for the classes were comparable to the same courses taken in the traditional format, and better than the rates for the conventional independent study courses. Eight references are listed, and an appendix provides a brief description of computer conferences and the Participation (PARTI) system. (Author/LMM)

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SUPPORTING THE DISTANCE LEARNER WITH COMPUTER TELECONFERENCING

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Paper presented at the 15th Annual Convocation of the Northeastern Educational Research Association, Ellenville, New York, October 25, 1984.

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ABSTRACT:

SUPPORTING THE DISTANCE LEARNER WITH COMPUTER TELECONFERENCING

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The National Home Study council has estimated that over 3 million people study by correspondence each year. The Council further estimates that these courses have only a 55% "raw lesson completion rate." The high attrition rates frequently associated with such programs are a major area of concern. How can institutions of higher education help distance learners maintain the high level of motivation necessary for completion of degree-programs? It is proposed in this study that some of the problems experienced by distance learners will be successfully addressed with the use of computer teleconferencing to enhance the educational experience. This study explores the use of a computer teleconferncing system developed by Participation Systems Inc. (nicknamed PARTI) as as enhancement for two independent study credit course in the behavioral science. Various evaluation techniques were used to probe the strengths and weaknesses of this pilot program. The results indicate that the use of teleconferencing courses positively effects both the quality of the educational experience, as well as the attitudes and motivational levels of the students. Monitoring of the conference indicated that 90% of the students made substantial use of the system. The completion rates for the classes were comparable to the same courses taken in the traditional format, and better than the rates for the conventional independent study courses.

INTRODUCTION

Between 1972 and 1982, the percentage of women, minorities and the adult population attending college increased significantly. In addition, part-time college enrollments increased at a rate four times greater than that of full-time enrollments (American Education Magazine, 1983, Aug/Sept, p. 3). Adult learners are the most rapidly growing segment in American education. Several interrelated factors contribute to this growth:

* the market place continues to require new knowledge and skills,
* new job opportunities for women and ethnic minorities are escalating the need for occupational, and professional training; and
* age barriers to education for adults is being challenged along with other discriminatory practices in education (Cross, 1979, pp. 75-78).

Self-paced independent study removes many of the barriers that prevent adult learners from completing courses toward earning a college degree. Such barriers include: employment obligations involved in traveling or rotating shifts, family obligations, physical handicaps and/or residing in geographically isolated locations that prevent regular classroom attendance. The National Home Study Council estimates that over three million people study by correspondence each year. Learning at a distance, through independent study is appealing to many adults because it can

be combined with ongoing activities. College course requirements can be fulfilled at individual rates and times that are most convenient to the busy adult.

Distance learning, however, is not without its problems, some of which are demonstrated by the high attrition rates frequently associated with such programs. Participants in a correspondence environment readily lose interest and stop submitting assignments even after paying the course fees. The very nature of correspondence study isolates a student from other students in the program. Moreover, students do not develop a sense of affiliation with the institution and drop out of the program. Mr. Michael Lambert, Director of the National Home Study Council, reports that the "raw lesson completion rate" of independent study schools is 55% (Lambert, 1984). How can institutions of higher education help distance learners maintain the high level of motivation necessary for the completion of degree-programs?

COMPUTER TELECONFERENCING

New York Institute of Technology has developed an innovative strategy to meet the needs of distance learners who have been neglected by more traditional institutions. This innovation is computer teleconferencing. It is projected that by the year 2000, distance learning will use information technology, such as computer teleconferencing, at the rate of 80% in comparison to an on-campus rate of 10% to

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20% (Feasley, 1984). Computer teleconferencing enhances NYIT's nontraditional educational delivery system for the off-campus adult distance learner and is based on the increasing availability and popularity of the inexpensive personal computer. Unlike correspondence courses and other distance learning programs, the use of computer-mediated technology gives students on-going access to mentors and academic advisors, as well as other students. Mentors will guide NYIT's off-campus students toward the fulfillment of course requirments and preparation for a competency-based final examination.

Computer teleconferencing is designed to address directly the major difficulties usually associated with conventional correspondence instruction. Through the use of a nationally available communications service such as Telenet, an individual located anywhere in the United States can dial into the appropriate computer system for the cost of a local or limited long distance telephone call. Figure 1 shows the communication network between the mentor and students using the VAX 11/788 mainframe computer.

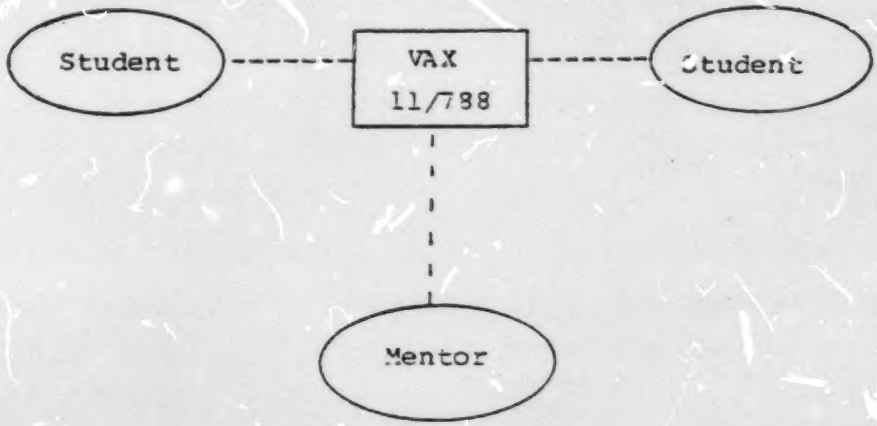

Figure 1: Communication Network for Computer Teleconferencing

Once into the system, the user reads notes and messages, both public and private, and responds to those notes with messages of his or her own. Whether the individual is a mentor placing information in the system for review by students or a student looking at, reacting to, and interacting with the information, the process is independent of location and time.

NYIT's computer teleconferencing system is a substantially modified version of Participate, a system developed and owned by Participation Systems, Inc. (PSI) of Winchester, Massachussets and running in an earlier version on The Source. This system has been extensively modified by both PSI and NYIT's systems personnel to make it more applicable within an educational environment.

WHY COMPUTER TELECONFERENCING?

During the spring and summer of 1983, an electronic mail component was incorporated into two independent study psychology courses. The purpose of this pilot was to test the efficacy of electronic mail as the delivery system for independent study courses with an overall objective of facilitating communication between instructor and student. To accomplish this, distribution lists were created for each class with each student included as an addressee so that all of the instructors' communications could be shared. This approximated a teleconference where one message would be distributed to each of the student participants. In

addition, private electronic mail messages were used when appropriate. The students were encouraged to introduce themselves to each other on-line and personalize the interactions by using first names rather than by ID numbers as required by the system.

The traditional independent study student using the U.S. postal service as its delivery mechanism is concerned with the amount of time necessary to answer homework assignments and the turn around time needed once the assignment is put in the mail. A typical first class letter takes from two to four days to reach the Institute and the same time is needed for the response to reach the student from NYIT. This lag in receipt and response time can inhibit detailed elaboration. By using electronic mail in the delivery of homework assignments, an interactive exchange and exploration of ideas is created. Too often, students working independently using a print-based delivery system do not achieve a similar exchange of ideas or develop insights. The instructors were able to immediately respond to the students' questions, provide information, positive feedback and encouragement in guiding students toward the successful completion of the course. Not only did students use the convenience of electronic mail to discuss course related issues but, surprisingly, in one class, two of the students used the system to tutor one another in a math course. They created an electronic social support system that increased their affiliation with each other and with NYIT as well. It became

obvious that electronic mail as a delivery system was a desirable alternative to print-based independent study.

THE ADVANTAGES OF COMPUTER TELECONFERENCING

In March 1984, NYIT used computer teleconferencing to facilitate students' progress in two behavioral sciences independent study courses. Subsequently, four independent study courses, Introductory Psychology, Principles of Economics I, World History I, and Operations Management, included a computer conferencing component.

In September 1984, NYIT will offer approximately one hundred courses via computer teleconferencing through NYIT's distance learning arm, the American Open University (AOU).

Computer teleconferencing is qualitatively different from electronic mail and the differences become more apparent with continued use. Computer teleconferencing incorporates all of the features of electronic mail and more (Table I). It is more powerful and more flexible than electronic mail and has many advantages for use in an educational environment. Computer teleconferencing is designed to foster group-oriented communication and most importantly, interactivity. It also maintains an ongoing transcript of all interactions. Students can simply go back to any entry in the conference, reread and review an assignment or explanation of a concept (see Appendix A for a fuller description of computer teleconferencing).

TABLE I

Advantages Of Computer Teleconferencing

1. FAST -- Immediacy Of Response
2. CONVENIENT -- Distance Independent
3. END TO "TELEPHONE TAG" -- Asynchronous Communication
4. ONE-TO-ONE COMMUNICATION -- Privacy
5. ONE-TO-MANY COMMUNICATION -- More Efficient
6. GROUP COMMUNICATION
   * Interactive Exercises -- Discussions
     Debates
     Case Studies
     Polling
   * Branching Topics
7. SOCIAL AFFILIATION
   * Identification With The Institution
   * Access People With Similar Or Varied Interests
   * "Esprit De Corps"
8. PERMANENT TRANSCRIPT

BRANCHING

PARTICIPATE, the system we are using at NYIT, is a branching computer teleconferencing system. In an educational setting, conferences are organized around specific courses, e.g. Introductory Psychology, World History, etc. An especially attractive feature of Parti is its simple branching capability. Many courses include topics which require either special attention or are tangentially

related to the main topic. Students who are members of the main course conference are automatically notified and asked to join a newly create branch conference.

Figure 2 illustrates the organization and use of branching as a component of a behavioral sciences course, Introduction to Effective Communication. The first branch, "2461H", was designed to separate homework assignments from the main course conference. Each week one student was assigned the responsibility of entering one homework assignment in this branch so that the information could be shared with the other members of the course. The ability to create branch conferences increases a mentor's options in the organization of subtopics. Discussions can occur in the branches without waiting for all students to agree to proceed. This "waiting" often occurs in a linear conferencing system where branches are separate entities created at the consensus of the group. Mentors and students using a branching conferencing system have the advantage of interactively pursuing topics in a flexible manner that is not dependent on sequentially ordered responses.

The methodology and principles of human relations were used in organizing the computer teleconferencing component of the course, Introduction to Effective Communication. As an introductory exercise designed to create a sense of "electronic rapport," the students were asked to share personal information in the form of an introduction and explain their motivations for taking the course.

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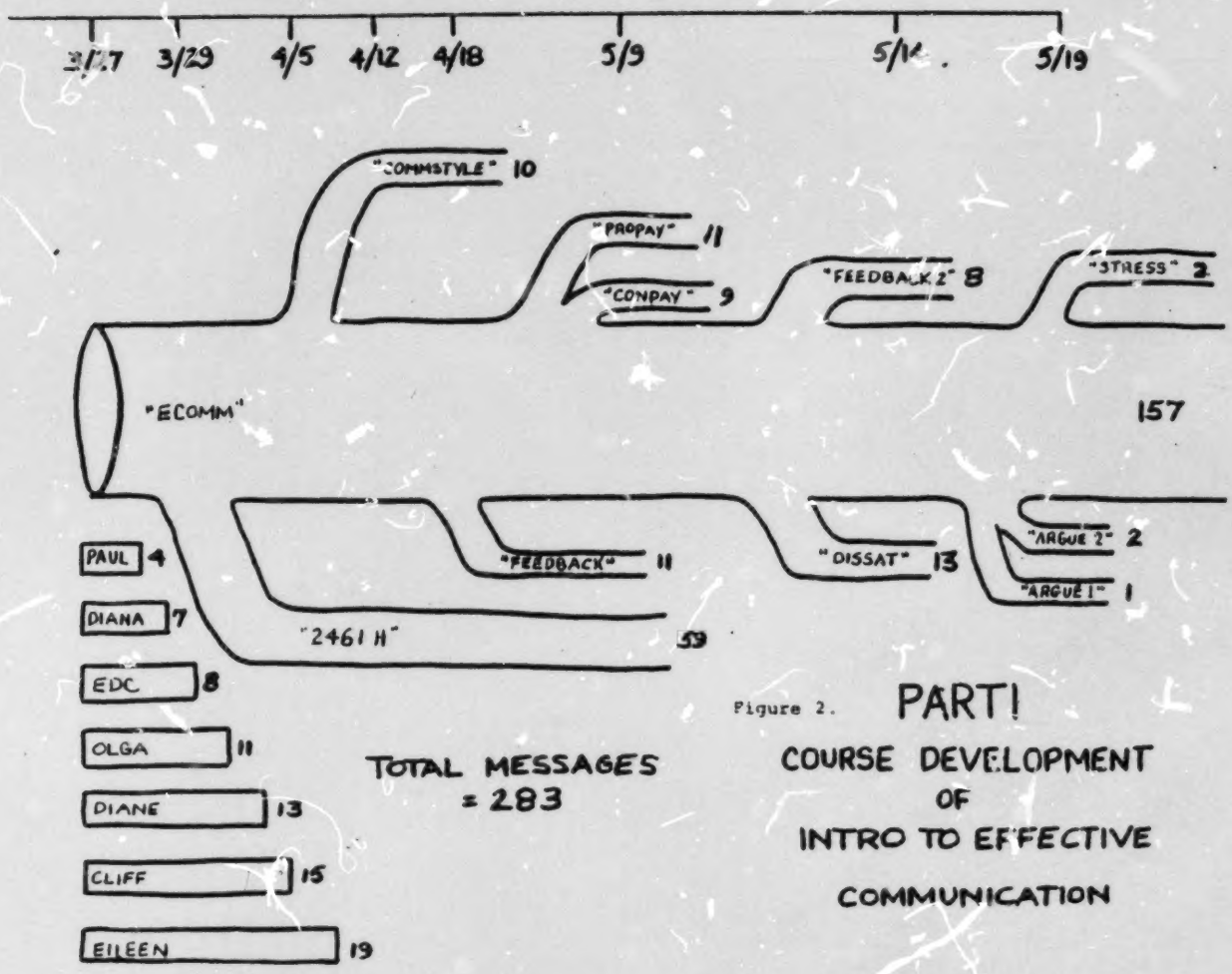

Figure 2.

In addition, separate student conferences were created to discuss quiz results as well as private concerns or problems. The students were encouraged to interact with one another by discussing topics and sharing solutions to issues presented in the main course conference. The mentor provided positive feedback for each of their conference contributions. A variety of teaching methods -- application exercises, buzz groups, debates, polling and mini-quizzes -- were used in this conference to increase student participation and interactivity.

The branches in Effective Communication are designed around course-related application exercises, and themes. The branch "Commstyle" explores the ramifications of communication style bias and its effect on interpersonal relations. Ten students participated in this exercise and gained insight about their preferred communication style. The "Commstyle" exercise did not interrupt the flow of the main conference or the branch, "2461H" homework conference. Motivation theory and the merits of pay and other motivators was debated in two branch conferences called "Propay" and "Conpay". Students were asked to volunteer for and defend one position, pro and con, on the subject; debate issues and challenge the facts and opinions presented by the other side. Other possible uses of the branching technique include role-playing, hypothesis testing, and case studies.

Is branching appropriate for use in all courses? Introductory Psychology, World History I and the two other experimental courses on the NYIT Parti system did not use the branching feature. The objective of Introductory Psychology, a survey course, is to teach students technical concepts and a vocabulary of psychological terminology in a very short period of time. The topics are not discussed in detail because there are so many to cover. The computer teleconferencing entries in the Introductory Psychology course focus on the clarification of concepts, and content questions raised by the conferencing students parallel questions discussed in conventional class sessions.

Subtopics or related issues are not discussed and the students question the mentor rather than one another. Based on this information, it is reasonable to state that the very nature of a course may determine the use of branching and the amount of student to student interactivity. An advantage of computer teleconferencing is that all participants benefit from the clarification of a concept regardless of who originates the question. Other issues related to the personality, creativity or sophistication of the conferencing moderator may also affect the use of branching as an organizational tool. There may even be a relationship between student interactivity and the personality of the mentor.

STUDENT PARTICIPATION IN COMPUTER TELECONFERENCING

NYIT students self-selected the computer teleconferencing section of certain independent study courses in response to a "call for volunteers." It was hoped that the use of "volunteers" would insure a group of highly motivated individuals who would persevere beyond the inevitable frustrations of assembling unfamiliar computer equipment at home and in learning the computer teleconferencing command structure. NYIT loaned each of the students a terminal, modem and monitor for the eight-week duration of the course. For the two psychology courses, a total of 15 students volunteered to join the "Parti," of

which 7 are male and 8 are female. The opportunity to learn this technology appears to be evenly distributed between the sexes. The students ranged in age from 20 to 52 years old. Table II shows the distribution of students by age in the two teleconferencing courses. Forty percent of the students were over 30 years of age and the mean age was 30.7 years old. Only four of the students had any prior computer experience.

TABLE II

Age Of The Computer Conferencing Students

Age	Percent of Classes
20 - 24	40
25 - 29	20
30 - 34	13
35 - 39	0
40 - 44	7
45 - 49	13
50 - 54	7
Total	100

A specially prepared training manual, "Using Participate, Welcome to the Parti," was clearly and simply written by a team of NYIT technical writers. The manual includes instruction on accessing the system, reading and writing notes in conferences, using conferences and branches as well as a list of Participate commands. The manual was

designed to teach the Parti commands to a distance learner who would not have access to the NYIT campus. Therefore, our training strategy did not include a "hands-on" workshop for these students. NYIT's programming staff modified the command choices to display command options in a menu format for the novice user. In a very simple procedure, the menus can be turned off once the user becomes comfortable with the commands. (All of this is explained in the manual.) This first group of student volunteers did have access to technical support via the telephone and in person. Questions were answered and many times the technician was able to troubleshoot simple problems over the telephone. Since NYIT has decided against providing computer equipment in the future, many of these basic technical problems will not reoccur. Instead, NYIT will focus its efforts on those potential students who already own a personal computer, or who are planning to purchase one and assume the reponsibility of ownership. Nevertheless, our experience indicates that there is a need for technical support when students have questions regarding computer conferencing command procedures.

SYSTEM USE EVALUATION REPORT

Questions regarding the evaluation of a computer teleconferencing course need considerable attention. What amount of time (hours) spent on the computer teleconferencing system, what "magic" number of messages or lines entered by

participants, constitutes a successful conference? Should a student's participation or lack of participation be reflected in a final grade -- especially when you consider that students choosing this course delivery system are involved in a myriad of other activities? This issue is further complicated by the design of an educational program that emphasizes a grade on a competency based final exam rather than on the traditional "weighted" assignment approach. Our limited experience indicates that the number of conference messages vary by course, by mentor, and by the number of students participating. A breakdown of the total number of messages submitted by mentors in comparison to student messages in the two psychology courses is shown in Table III.

TABLE III

Total Teleconferencing Messages Between Students And Mentors

Course	Student Messages Total	Student Messages Per Student	Mentor Messages Total	Mentor Messages Per Student	Total Messages Total	Total Messages Per Student
Introduction to Effective Communication (n = 11)	136	12.4	147	13.4	283	25.7
Introductory Psychology (n = 4)	37	9.3	49	12.3	86	21.5

Table IV lists student and mentor participants and indicates the total number of hours they spent on the computer teleconferencing system. Each of these courses ran for eight weeks. The students in the Introduction to Effective Communication class averaged 8.8 hours on the computer conferencing system and those in the Introductory Psychology class averaged 13.4 hours. Thus, these students spent between 1 and 1 1/2 hours per week on computer teleconferencing.

One student in each class spent almost twice the average amount of time on the system, indicating "extracurricular" activity. One student, with no previous computer experience, learned to regularly request technical assistance from non class members through the use of a public conference (also on the system) established for just that purpose.

A preliminary analysis of student time on the system compared to the student's final grade in the course does not indicate that there is a correlation between the two variables. A comparison of computer conferencing student grades with those in the same course but not using the system indicates that the grade distributions are comparable. Because our sample of students is in no way representative of the total population, further research investigating the possibility of a relationship between participation time in a conference and final grade seems appropriate.

TABLE IV

Mentor And Student Participation
In Computer Teleconferencing Courses
At New York Institute of Technology

Course	Student	Mentor	Male	Female	Hours
Introduction		A. Richards	X		70.00
to Effective	A.H.		X		9.67
Communication	P.M.		X		3.74
	D.A.			X	7.03
	A.B.			X	12.30
	B.P.			X	9.02
	E.S.			X	2.64
	D.E.			X	6.70
	D.K.		X		13.79
	C.Y.		X		10.45
	O.H.			X	16.88
	E.C.		X		4.55
			STUDENT TOTAL		96.77
			STUDENT AVERAGE		8.80
Introductory		P. Haile		X	67.60
Psychology	F.B.		X		24.84
	J.D.			X	11.42
	J.S.		X		5.12
	G.D.			X	12.26
			STUDENT TOTAL		53.64
			STUDENT AVERAGE		13.40

Student Evaluation

A telephone evaluation of the computer conferencing experience from the student's point of view revealed the following information (Table V). Of the total 15 student participants, 93% responded to our survey. Although this is attitudinal information based on a very small, nonrepresentative sample, it does provide feedback on their experiences. Ninety-six percent of the students responding indicated that they would like to take additional computer conferencing courses. Many of the students (86.4%) communicated with other students who were members of their courses. Eighty-two percent of the students felt comfortable enough with the computer conferencing system to become members of other conferences not related to their course. The most important advantage of computer conferencing in the opinion of 68% of the students, was the on-going ability to communicate with their mentors. The sharing of ideas with other students was favored by 50% of the students. Many of the students offered comments on the need for both student and mentor to learn the conferencing system command structure prior to beginning a course.

Students in one of the courses were asked to participate in an on-line evaluation conference as they progressed through their course. The following exchange between two of the students illustrates the strengths and the weaknesses of the system.

TABLE V

Follow-Up Survey Of Student Attitudes Toward Computer Conferencing

SA = Strongly Agree
SD = Strongly Disagree
NA = No Answer

	SA				SD	NA
1. The PARTI manual made learning the computer conferencing commands a simple procedure.	5 31.8%	4 22.7%	3 40.9%	2 4.5%	1 -	-
2. Sharing my ideas in a discussion with other students is an advantage of computer conferencing.	5 50.0%	4 22.7%	3 4.5%	2 13.6%	1 4.5%	4.5%
3. On-going access to my mentor is an advantage of computer conferencing.	5 68.1%	4 22.7%	3 4.5%	2 4.5%	1 -	
4. The clarification of required course terminology is an advantage of computer conferencing.	5 40.9%	4 27.2%	3 27.2%	2 4.5%	1 -	
5. Sharing my homework assignment with other students, motivated me to do a better job.	5 45.5%	4 27.2%	3 9.0%	2 9.0%	1 4.5%	4.5%

Please indicate yes or no to the following statements.

	Yes	No
6. I would like to take additional computer conferencing courses.	95.5%	4.5%
7. I communicated with other students who were part of the computer conferencing course.	86.4%	9.0%
8. I joined other conferences in the system.	81.8%	18.2%

9 (of 36) DKONDRUP Apr. 23, 1984 at 22:04 ET (741 characters)

The computer conferencing course appears to contain a good deal more work than the normal, or conventional class or independant study. There is a new dimension of communication to adapt oneself to. There is also additional knowledge, or skills if you will that have to be mastered. The success of this initial course I believe must be placed with Angela Richards. She has shown an abundance of energy and has contiually motivated members to participate. Above all of this, praise set aside, there is a trememdous amount of work that the instructor appears to do.

I feel it is important that the student and instructor motivation as well as abilities must be extremely high for this type of conferencing to be sucessful.

12 (of 36) DACE Apr. 24, 1984 at 15:11 ET (1083 characters)

I agree that there seems to be more work and interaction with the parti system. How many people really tune in to their class everyday? You might get their attention for 1.5 hours every monday and wednesday, maybe!
In the begining I thought people were too occupied with the system itself, instead of asking questions about the class, although I really can appreciate getting use to a new media of communication. But after a week or so, the fact that we are communication via computer has become secondary and the class is in the "limelight". I do however believe that this type of education has to be used with certain levels of student responsibility. The classroom environment and campus surronding has some merit for developing one's character. Here students have to be responsible to pace themselves without direct or constant supervision.

Personally I really am enjoying it. In the past I have had to withdraw from classes or take a B instead of an A, because I couldn't attend all the classes.

Content Analysis

A content analysis was conducted on the computer printout of the Introductory Psychology conference. Four distinct categories of messages from both students and mentor emerged:

1. Class management/organization
2. Technical assistance witht the computer system
3. Motivation/social climate
4. Course content/clarification, reinforcement/question and answer/ discussion

Almost one-quarter of the total conference messages contained statements representing more than one category of messages. Most of these messages with more than two categories used category three (motivation) as the second category. An example of each category can be found in Table VI.

While all four categories of messages were used by both the students and the mentor, the distributions of use were quite different (Table VII). While 78% of the mentors messages contained statements referring to the course content, 90% of the students' messages contained such statements. The mentor addressed motivational/social climate issues in 54% of her messages, whereas only 10% of the students' messages refer to motivation/social climate.

Category 2: Technical assistance appeared in messages only during the first two weeks of the course. The other 3 categories appeared in messages throughout the course.

TABLE VI

Examples Of Categories of Messages
Used In A Computer Teleconferencing Course

Category 1: Class management/organization

29 (of 92) PHAILE Jul. 2, 1984 at 9:00 ET (562 characters)

For Chapter 5, let's discuss on PARTI question 2 which looks at two quite different theories about how it is we see the way we do (for instance, we "see" depth).

For Chapter 7 on Learning, we'll tackle the first question about the differences between classical and operant conditioning. This is a most important question, and not an easy one. Please ask if you have any questions on this material!!

For Chapter 8, on Memory, we'll discuss the role played by inferences, stereotypes, and schemata in memory (Question 3).

Looking forward to your thoughts.

Category 2: Technical assistance with the system

6 (of 92) PHAILE Jun. 19, 1984 at 22:17 ET (725 characters)

Good evening,

Everyone in our PARTI has a separate "topic" with his/her name. This "topic" is to be used as a private means of communication between you and me. I'll leave personal notes to you in your "topic" and you can send me personal notes in your "topic".

Your separate "topic" name is your first name and last name initial (FuadeB, GailD, JaneD, etc.).

Just for review: to send a message to our "topic" ("2401") just type "w" at any ACTION on prompt. Then return the carriage and you can type in your meassage to all of us. When you're finished typing in the message (don't worry about typos!!!), then hit the return key and type .s "2401" on a new line and hit the RETURN key. That's it! Have fun!

Ciao.

Table VI...Continued

Category 3: Motivation/social climate

8 (of 92) FBISSAR Jun. 20, 1984 at 16:08 ET (476 characters)

Hi,
My name is Fuad Bissar, I finally got my computer working. it took me awhile, which is funny because i am a computer science major!
I share an apartment with my girlfriend, Jennie. We have no children! The both of us work at a dance club called, MALIBU, I'm 25 years old and getting older every minute! I really don't have any hobbies, I like to do a little of everything.
I am excited about this class!

See You!

Category 4: Course content

12 (of 13) JDISANTO Jul. 14, 1984 at 13:16 ET (888 characters)

I performed the following experiment on conservation of mass wiy a 1/2 yr. old daughter, Alana. I took 8 oz. of water in a measuring cup and poured
it
into a short but wide glass. Same procedure poured it into a ta, narrow glass. Alana claimed that the wider, short glass had more water. I poured
each
Glass' contents back into the measuring cup (indidually) and showed Alana
that
each time the water level reached "the red line" (8 oz.) Her explanation
then
was "but that glass is different" (the measuring cup). Repeating the
experiment
in front of her again brought the same results - the wider, short glass had
more!

**Questions for Dr. Haile: I have seen this concept accepted by children much yngr than 7 years old. Altho
I
realizePiaget's ages are approximations, if one is to accept his stages, could it be that over the years children are progressing through the
stages
quicker?

(sic)

TABLE VII

Use Of Categories Of Messages By
Mentor And Students

Category	Mentor (Total Messages = 37)	Students (Total Messages = 49)
1. Class management	11 (30%)	1 (2%)
2. Technical assistance	3 (8%)	2 (4%)
3. Motivation	20 (54%)	5 (10%)
4. Course content	29 (78%)	44 (90%)

CONCLUSION

The results of this pilot project show that, at least for this small group of self-selected students, the computer teleconferencing component of the courses was enthusiastically received. Ninety-five percent of the students indicated that they would like to take additional computer teleconferencing courses. These student volunteers were equally divided between male and female students, although our conventional classes are 70% male. Women do not seem to be resistant to using high technology in pursuit of their educational goals. Only 25% of the students had any prior computer experience. This lack of prior training did not hinder the students' participation in the computer conferences (although those students with prior computer experience were more likely to engage in "extracurricular activity" on the system, as indicated by the number of hours they logged in over the 8-week course period).

All of the students were able to learn the fundamentals of computer conferencing within the first two weeks of the course. Mentor messages providing technical information were not sent after the second week of the class. For this first two-week, practice period, the mentor had the major responsibility for sending messages of encouragement and course structure, and providing material with which students could practice the system.

Students spent, on the average 1 to 1 1/2 hours per week on the teleconferencing system. The number of messages sent by students varied by course from 9 to 12 messages per student for the 8-week period. Although the mentors in both classes sent more messages than did their students, the difference between number of messages from students compared to mentors decreased as the class size increased. This may indicate that there is a ceiling effect for the number of messages per student a mentor will generate within a teleconferencing course. This one-to-many communications delivery system may prove to be cost effective for distance education.

Students using teleconferencing felt that they primarily gained access to the course instructor and greater clarification of course concepts. Secondarily, students felt they were able to share ideas in discussions with other students. Donna Queeney (1984) reports that surveys of adult learners show that adults prefer instructor-centered instruction where class organization and content are

explicitly managed by the instructor. Adults want instructors to faciliate the learning process and to have a "controlled reciprocal relationship" with the student.

The computer teleconferencing component to distance education seems to meet this need. Ninety percent of the students' messages in our pilot program were content-related. The mentor acted as class organizer and motivator, as well as "content expert." The students, for the most part, responded to questions posed by the mentor and posed their own content-related questions primarily to the mentor. Computer teleconferencing seems to be ideally suited for distance education and the needs of the adult learner, since adult learners prefer "an informal learning atmosphere where they can feel comfortable asking questions and making comments (Queeney, 1984, p. 5)."

None of the students opened a branch conference, nor engaged in lengthy private exchanges with other students. This extreme concentration on the "business" of the course may reflect the inexperience of the students with the medium (computer teleconferencing), as well as the adult learners preference for standardized courses which will prepare them well for subsequent coursework (Queeney, 1984, p. 4).

It should be noted, too, that we did not find any evidence of "flaming" in the computer conferences. "Flaming," as described in a recent article in The New York Times refers to emotional outbursts such as rudeness or use of profanity by people when they carry on discussions via

computer. Researchers at Carnegie-Mellon University have found frequent examples of "flaming" both in experimental groups and in actual working environments (Eckholm, 1984, p. C1). The students and mentors in this pilot program, while occasionally used an informal, conversational tone, never used profanity nor displayed rudeness.

Enhancements Of Computer Teleconferencing

Off-line word processing, as well as file up and download capability, will improve the quality of the messages entered in an educational conference. Both mentor and student need the ability to carefully consider a message, revise the message and then send it to the conference.

Access to library data-bases, interactive computer exercises and other sources of information such as SPSS will enhance the distance learner's ability to manipulate information, prepare reports and actively engage in the academic process.

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What is Computer Conferencing?

Computer conferencing gives users access to a central computer, either by operating direct terminals or by a microcomputer connected to the mainframe by telephone. Messages are stored in the computer and made available at any time. Through personal computers participants can connect to the computer at their convenience and receive or transmit information. People who are on the system can "talk" to each other by writing text that appears on the screen. (It is not a "teleconference" using television images).

Discussions are organized within a series of conferences, with each conference focused on a specific topic by the conference organizer. Messages can be sent to all members of a conference, to selected members of the conference, or to a single person. Nearly all brands of microcomputers, regardless of cost, are compatible with this system.

In some ways, computer conferencing is similar to electronic mail. Designed primarily for one-to-one communications, electronic mail can be manipulated to handle one-to-many and many-to-many communications. But these uses are awkward and difficult. Because computer conferencing is designed for group communications, it is more powerful and more flexible than electronic mail.

Computer conferencing can be linear or branching. In each case, the conference is a topic-oriented discussion which builds a permanent transcript of its proceedings. In a linear system, each set of communications is organized into a separate conference and each conference can be read sequentially from beginning to end. To pursue a new topic which emerges from a conference, a new conference must be created. In a branching computer conference system, a conference is created on a specific topic. If a new topic develops, it branches off the first, and each conference can then continue along its own path. Participate, the system used at NYIT, is a branching computer conferencing system.

A Brief Overview of Participate

The principle communication activities in Participate take place within conferences. Once a conference has been established by its organizer, notes are sent to it by all authorized users, and these notes can be read by all conference members. The conference organizer controls the conference: he or she authorizes membership in a conference, and determines the nature of that membership (read-only, read and write, etc.).

Once a conference has been created, and membership has been established, each member can read and write notes that are sent to the conference. At any time, a conference member can log

on and read those messages which have been sent by other members of the conference. Once messages are read, they do not disappear; they are stored in memory and are available at any time.

Conferences are organized around specific topics. Since there can be many topics worth pursuing in a course, it is possible to create conferences which branch off the main conference, and which can be open to those users who have a need to pursue the topic discussed in the sub-conference. In addition to sending notes to conferences, users can send private messages to individual members of the conference. Thus students can communicate privately with their instructors.

Some two hundred and fifty people associated with NYIT are using Parti as an experimental medium for education, including a number of faculty and students involved in teaching college courses via computer conferencing. NYIT has developed and field tested user manuals for Parti, one for faculty and one for students.